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## The Butterflies of the Van Voast-American Museum of Natural History Expedition to the Bahama Islands, British West Indies

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Since the appearance of the author's paper entitled "The butterflies of the Bahama Islands, British West Indies (Lepidoptera)" (1952, Amer. Mus. Novitates, no. 1563, pp. 1-18), the Van Voast-American Museum of Natural History Expedition has gone to the Bahama Islands, and extensive collections of insects were made. On this trip 654 butterflies were taken, so it was thought advisable to publish the results in order that a clearer picture can be obtained concerning the butterfly fauna of this group of islands. In addition, a few more specimens from the Bahama Islands have been incorporated in the collection of the American Museum of Natural History since the appearance of the earlier paper, and a few additions and corrections from the literature have been noted; all these are included in the present paper.

The expedition collected throughout the Bahama Islands from late December, 1952, until mid May of 1953, beginning with North Bimini Island, and ending at Grand Bahama Island. Stops were made for collecting at virtually all the larger islands and cays, from the above two localities on the west to the Turks and Caicos Islands on the east. While this latter group is under the jurisdiction of Jamaica, so is not politically a part of the Bahama Islands, it is included here because of the similarity of the fauna. The majority of the insects on the expedition were col-

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lected by E. Hayden and L. Giovannoli, with some specimens being taken by G. Rabb.

All families of North American butterflies were taken on the expedition, with the exception of the Riodinidae and Libytheidae. However, of the former only a single endemic species is known from this area, and of the latter none is known to occur there. The number of specimens taken, by families, were as follows: 18 Papilionidae, 124 Pieridae, three Danaidae, 10 Satyridae, 218 Nymphalidae, 182 Lycaenidae, and 99 Hesperiidae. Three subspecies are described as new from this material, one in the Nymphalidae and two in the Hesperiidae. In addition to these new subspecies, the number of species or subspecies represented in the Bahama Islands was increased by seven over the previous paper. This means that the number of species or subspecies now known to occur in the Bahama Islands stands at 62. A breakdown of this figure, by families, shows that the biggest gain for the number of species and subspecies occurred in the Hesperiidae, which now has 16; this is closely followed by the Pieridae (15), Lycaenidae (13), and Nymphalidae (10), while the Papilionidae (3), Danaidae (2), Satyridae (2), and Riodinidae (1) are unchanged in the numbers of species represented.

Of the 62 specific records given, two still stand in the literature by specific name only, so it is not possible to place them to the appropriate subspecies; in addition, one skipper was not assigned a specific name owing to lack of adequate material. Of the remaining 59, three are found in common with Florida (5%), 19 in common with other islands of the West Indies (32%), 18 in common with both Florida and the West Indies (31%), while the remaining 32 per cent represent endemics. The last category includes four species (one each in the Pieridae, Satyridae, Riodinidae, and Lycaenidae) and 15 subspecies (five in the Pieridae, three in the Lycaenidae and Hesperiidae, two in the Nymphalidae, and one each in the Papilionidae and Satyridae). Hence it can be seen that this additional material has made some changes in the total picture of faunal relationships, as would be expected. The figures for the relationship with Florida and the percentage of endemism changed only 1 per cent, the former dropping while the latter increased by this amount. Similarly, there was a 5 per cent increase in the figures for the relationship with the Antillean fauna, and a 5 per cent drop for those butterflies that are found in both Florida and on the other islands of the West Indies. It is perhaps unnecessary to point out that more collecting and careful study of these insular populations need to be done before the final data on faunal relationships can be given.

The author wishes to acknowledge with thanks the help given him on identification of some of this Bahama material. Dr. Louis Marks aided

with the Papilionidae, and Dr. A. B. Klots assisted with some of the specimens of *Eurema*. Particular thanks are due to Mr. Ernest L. Bell, who made all the specific identifications in the Hesperiidae. The photographic work was done by Mr. Rudolph Schrammel of the Department of Insects and Spiders, and the author is most grateful to him for this.

## PAPILIONIDAE

### *Papilio polydamus lucayus* Rothschild and Jordan

*Papilio polydamus lucayus* ROTHSCHILD AND JORDAN, 1906, Novitates Zool., vol. 13, p. 521.

Fifteen specimens were captured on the expedition: Clarence Town, Long Island, March 13, 1953; James Cistern, Eleuthera Island, April 1, 1953; West End, Grand Bahama Island, May 12, 1953.

### *Papilio andraemon bonhotei* Sharpe

*Papilio bonhotei* SHARPE, 1900, Proc. Zool. Soc. London, p. 201, pl. 19, figs. 1, 1a-c.

A single male was taken at Governors Harbour, Eleuthera Island, March 31, 1953, and two females were captured, one at Nassau, New Providence Island, April 16, 1953, the other at Lisbon Creek, near South Bight, Andros Island, April 28, 1953. The Nassau specimen is a topotype.

## PIERIDAE

### *Ascia monuste eubotea* (Latreille)

*Pieris eubotea* LATREILLE, 1819, Encyclopédie méthodique, vol. 9, p. 144.

Fifty-six males and 16 females were taken at the following localities: Alicetown, North Bimini Island, December 30, 1952; Warderick Wells Cay, Exuma Cays, January 10, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; 2 miles east of Nassau, New Providence Island, April 14, 1953; Nassau, New Providence Island, April 16, 1953; Fresh Creek, Andros Island, April 23, 1953; Mangrove Cay, Andros Island, April 26, 1953; Driggs Hill, near South Bight, Andros Island, April 27, 1953; Lisbon Creek, near South Bight, Andros Island, April 28, 1953; Great Sale Cay, Abaco Cays, May 10, 1953; West End, Grand Bahama Island, May 12, 1953.

The Bahama population has rather narrow black borders on the forewings, being similar to the Cuban population in this respect. As far as it can be judged from our rather limited Cuban series of 10 males and eight females, some of the Bahama specimens tend to have an even nar-

rower border. They definitely average a narrower border than in the Jamaican and Hispaniolan populations, and the Bahama population may be one end of a cline for this character. Of the 10 females from the Bahama Islands in the Museum collection, none show the dark suffusion of the Floridian *phileta* population.

*Phoebis sennae sennae* (Linnaeus)

*Papilio sennae* LINNAEUS, 1758, *Systema naturae*, ed. 10, vol. 1, p. 470.

Two males and one female were captured at Clarence Town, Long Island, March 13, 1953; two males at Deadman's Cay, Long Island, March 11, 1953; one male at Governors Harbour, Eleuthera Island, March 31, 1953; a female at Lisbon Creek, near South Bight, Andros Island, April 28, 1953; and a male at West End, Grand Bahama Island, May 12, 1953.

*Phoebis agarithe antillia* Brown

*Phoebis agarithe antillia* BROWN, 1929, *Amer. Mus. Novitates*, no. 368, p. 15.

Five males and five females from the following localities: Alicetown, North Bimini Island, December 30, 1952; Warderick Wells Cay, Exuma Cays, January 10, 1953; Staniard Cay, Exuma Cays, January 13, 1953; Landrail Point, Crooked Island, March 5, 1953; Clarence Town, Long Island, March 13, 1953; near Port Nelson, Rum Cay, March 16, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Allans Cay, Abaco Cays, May 9, 1953; Eight Mile Rock, Grand Bahama Island, May 14, 1953.

*Kricogonia castalia* (Fabricius)

*Papilio castalia* FABRICIUS, 1793, *Entomologia systematica*, vol. 3, p. 188.

Three males from Fraziers Hog Cay, April 30, 1953, and Little Harbor Cay, May 1, 1953, both in the Berry Islands. These constitute the first records for this species in the Bahama Islands.

*Nathalis iole* Boisduval

*Nathalis iole* BOISDUVAL, 1836, *Histoire naturelle des insectes*, vol. 1, p. 589.

A single example from West End, Grand Bahama Island, May 12, 1953, is the only specimen of this species.

*Eurema nicippe* (Cramer)

*Papilio nicippe* CRAMER, 1779, *Papillons exotiques des trois parties du monde*, vol. 3, p. 31, pl. 210, figs. C, D.

A single, worn male was taken March 28, 1953, at New Portsmouth (Rock Sound), Eleuthera Island.

*Eurema messalina blakei* (Maynard)

*Terias blakei* MAYNARD, 1891, Manual of North American butterflies, p. 216.

Eleven males and eight females from the following localities: McQueen, Cat Island, January 23, 1953; Clarence Town, Long Island, March 13, 1953; The Bight, Cat Island, March 22, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953; West End, Grand Bahama Island, May 12, 1953.

*Eurema daira ebriola* (Poey)

*Terias ebriola* POEY, 1853, Memorias sobre la historia natural de la isla de Cuba, vol. 1, p. 250, pl. 24, figs. 7-13.

A single female from Staniard Cay, Exuma Cays, January 13, 1953, apparently represents the first Bahama record for this species.

*Eurema dina helios* Bates

*Eurema dina helios* BATES, 1934, Occas. Papers Boston Soc. Nat. Hist., vol. 8, p. 133.

A single specimen is referable here, taken at McQueen, Cat Island, January 23, 1953.

*Eurema chamberlaini chamberlaini* (Butler)

*Terias chamberlaini* BUTLER, 1898, Ann. Mag. Nat. Hist., ser. 7, vol. 1, p. 295.

Eight specimens are tentatively assigned to this name, but there is some doubt as to the correctness of this. Unfortunately, very little material of this rare species has been taken, so but little is known about the extent of the individual variability for the species. The whole problem must be reviewed whenever sufficient material comes to hand. The specimens referred to this name are from the following localities: Darby Island, Exuma Cays, January 18, 1953; McQueen, Cat Island, January 23, 1953; Landrail Point, Crooked Island, March 5, 1953; Deadman's Cay, Long Island, March 11, 1953; Clarence Town, Long Island, March 13, 1953; The Bight, Cat Island, March 22, 1953.

## DANAIDAE

*Danaus plexippus plexippus* (Linnaeus)

*Papilio plexippus* LINNAEUS, 1758, Systema naturae, ed. 10, p. 471.

A single, small, dark female was taken 2 miles east of Nassau, New Providence Island, April 14, 1953.

*Danaus gilippus berenice* (Cramer)

*Papilio berenice* CRAMER, 1779, Papillons exotiques des trois parties du monde, vol. 3, p. 22, pl. 205, figs. E, F.

A male and a female were captured at Alicetown, North Bimini Island, December 30, 1952.

## SATYRIDAE

*Calisto herophile apollinis* Bates

*Calisto herophile apollinis* BATES, 1934, Occas. Papers Boston Soc. Nat. Hist., vol. 8, p. 136.

Ten specimens were taken at the following locations: McQueen, Cat Island, January 23, 1953; Deadman's Cay, Long Island, March 11, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953.

The population of the Bahamas was separated from that of Cuba by the reduced markings of the under surface, having lighter and finer wavy lines, the postmedian line of both wings not being bordered externally by a light shading, and by the reduction of the bluish scaling surrounding the white postmedian spots of the hind wings. In this series of specimens, some of them from the topotype island, these characters are somewhat variable, but all the specimens show an external light shading, in some degree, to the postmedian line. There is considerable variation in the strength and course of the wavy subterminal lines on both wings beneath. Several specimens are quite similar to Cuban examples in this respect, while others definitely have thin, wavy lines on a lighter ground color than is seen in most Cuban specimens. The problem of the "bluish scaling" is a bit puzzling, as, when the hind wings are examined under a microscope the only bluish scales seen are those around the large dark ocellus, while the scales surrounding the white postmedian spots appear to be violet rather than blue. However, the Bahama series does appear to have less of this scaling than does the Cuban series, although this is rather variable in the latter case. More material is needed before the question of the exact status of this Bahama population can be satisfactorily settled.

## NYMPHALIDAE

*Dryas julia carteri* (N. D. Riley)

*Claenias julia carteri* N. D. RILEY, 1926, Entomologist, vol. 59, p. 240, pl. 2, fig. 1.

Thirteen specimens from the following localities: Deadman's Cay, Long Island, March 11, 1953; Clarence Town, Long Island, March 13,

1953; The Bight, Cat Island, March 22, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; James Cistern, Eleuthera Island, April 1, 1953; Hatchet Bay, near Alicetown, Eleuthera Island, April 2, 1953; Fraziers Hog Cay, Berry Islands, April 30, 1953. In addition to these, two females have been received from New Providence, December 3, 19, 1951 (Dodge).

*Agraulis vanillae insularis* Maynard

*Agraulis insularis* MAYNARD, 1889, Contributions to science, Newtonville, Massachusetts, vol. 1, p. 89.

This species was apparently the commonest butterfly seen on the expedition, as 108 specimens were taken. Of this series, 28 individuals were females. The localities are as follows: Alicetown, North Bimini Island, December 30, 1952; Big Farmer's Cay, Exuma Cays, January 1, 1953; Warderick Wells Cay, Exuma Cays, January 10, 1953; Staniard Cay, Exuma Cays, January 13, 1953; Little Farmer's Cay, Exuma Cays, January 17, 1953; Darby Island, Exuma Cays, January 18, 1953; McQueen, Cat Island, January 23, 1953; Matthew Town, Great Inagua Island, January 31, 1953; West Caicos Island, Turks and Caicos Islands, February 4, 1953; Grand Turk Island, Turks and Caicos Islands, February 19, 1953; cays 3.5 miles southwest of North Caicos Island, Turks and Caicos Islands, February 28, 1953; near Abraham Bay, Mariguana Island, March 3, 1953; Landrail Point, Crooked Island, March 5, 1953; near Albert Town, Fortune Island (Long Cay), March 7, 1953; Fish Cay, south of Fortune Island (Long Cay), March 8, 1953; Deadman's Cay, Long Island, March 11, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; James Cistern, Eleuthera Island, April 1, 1953; Hatchet Bay, near Alicetown, Eleuthera Island, April 2, 1953; 4 miles southwest of Nassau, New Providence Island, April 8, 1953; 2 miles east of Nassau, New Providence Island, April 14, 1953; Fresh Creek, Andros Island, April 23, 1953; Little Harbor Cay, Berry Islands, May 1, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953; West End, Grand Bahama Island, May 12, 1953. In addition to these, a single female has been received from New Providence, January 2, 1952 (Dodge).

*Euptoieta hegesia hegesia* (Cramer)

*Papilio hegesia* CRAMER, 1779, Papillons exotiques des trois parties du monde, vol. 3, p. 30, pl. 209, figs. E. F.

Another of the more common butterflies, with 49 specimens having been taken at the following points: Alicetown, North Bimini Island, December 30, 1952; Staniard Cay, Exuma Cays, January 13, 1953; Darby Island, Exuma Cays, January 18, 1953; McQueen, Cat Island, January 23, 1953; Matthew Town, Great Inagua Island, January 31, 1953; near Abraham Bay, Mariguana Island, March 3, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; 2 miles east of Nassau, New Providence Island, April 14, 1953; Nassau, New Providence Island, April 16, 1953; 4 miles southwest of Nassau, New Providence Island, April 18, 1953; Fresh Creek, Andros Island, April 23, 1953; Lisbon Creek, near South Bight, Andros Island, April 28, 1953; West End, Grand Bahama Island, May 12, 1953; Pine Ridge, Grand Bahama Island, May 13, 1953.

*Phyciodes frisia frisia* (Poey)

*Melitaea frisia* POEY, 1832, Centurie de lépidoptères de l'île de Cuba, no. 2, 3 figs.

Eight males and three females were taken, as follows: Staniard Cay, Exuma Cays, January 13, 1953; South Caicos Island, Turks and Caicos Islands, February 11, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; James Cistern, Eleuthera Island, April 1, 1953; Fraziers Hog Cay, Berry Islands, April 30, 1953; West End, Grand Bahama Island, May 12, 1953.

The Museum specimens were inadvertently omitted from the author's preceding paper. They represent the following localities: Nassau, March 13, 1930 (W. P. Rogers), March 12, 1915; South West Bay, Nassau, March 17, 1930 (W. P. Rogers); Los Cayos, Nassau, May 8, 9.

*Anartia jatrophae guatanamo* Munroe

*Anartia jatrophae guatanamo* MUNROE, 1942, Amer. Mus. Novitates, no. 1179, p. 2.

Twenty-four specimens were taken, and they extend the range of this butterfly in the Bahamas to a considerable extent. The localities are as follows: McQueen, Cat Island, January 23, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; The Bight, Cat Island, March 22, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound),

Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; West End, Grand Bahama Island, May 12, 1953.

*Junonia evarete zonalis* C. and R. Felder

*Junonia zonalis* C. AND R. FELDER, 1867, Reise der Oesterreichischen Fregatte "Novara" um die Erde, vol. 1, p. 399.

Six specimens, as follows: McQueen, Cat Island, January 23, 1953; Clarence Town, Long Island, March 13, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Hatchet Bay, near Alice-town, Eleuthera Island, April 2, 1953; 2 miles east of Nassau, New Providence Island, April 14, 1953; West End, Grand Bahama Island, May 12, 1953.

The color of the under side of the secondaries is quite variable in these six examples. The Cat Island male is broadly suffused with reddish brown; the female from Long Island has considerable orange brown shadings; the male from New Portsmouth is suffused with grayish lilac scaling; the worn female from Hatchet Bay appears to be a dull brownish, more like the Nassau specimens in the Museum collection, while the female from Grand Bahama Island is lightly scaled with reddish brown.

*Lucinia sida albomaculata*, new subspecies

Figures 3-6

MALE: Shape of primaries as in male of nominate Cuban subspecies, but on the secondaries the outer margin tends to be slightly more deeply indented between the veins.

UPPER SURFACE OF WINGS: Forewings, ground color orange-brown, with maculation similar to that of nominate subspecies; elongate black mark at end of cell narrow, 0.5 to 1.0 mm. in width, with strong outward curve, enlarged distally but not extending into cell  $Cu_1$ ; postmedian black markings subtriangular, not reaching subterminal black border; subterminal gray-black border extending at right angle from costa to vein  $R_4$ , outwardly oblique to  $R_5$ , then sharply narrowed in cells  $M_1$  and  $M_2$ , jutting out again on veins  $M_2$  and  $M_3$ , tapering posteriorly to a thin black line in cell  $Cu_2$ ; black mark at tornos subtriangular or narrowly rectangular, not extending to vein  $Cu_2$ . Secondaries concolorous with primaries, with extremely faint violet iridescence; gray-black patch near apex extending to vein  $RS$ , with a few black scales extending into cell  $RS$ ; border of wing with narrow black line, wider anteriorly, extending on veins to wing margin in upper portion of wings; terminal area of ground color or slightly darker, consisting of lunate patches to middle of wing, subequal in width to width of black band, and being entire posteriorly.

UNDER SURFACE OF WINGS: Forewings, ground color orange-brown; black mark at end of cell tending to be slightly straighter to end of cell than on upper surface, then narrowed and with marked curve to terminal enlargement; apical area with large white mark, extending from junction of veins  $R_{4+5}$  into center of cell  $M_1$ , with distal margin in cells  $R_5$  and  $M_1$  truncate, deeply indented anteriorly in cells  $R_3$  and  $R_4$ , but extending distally along costa, the entire distal margin with a dark diffuse line; subterminal line bluish purple, with considerable white scaling at origin in cells  $R_3$  and  $R_4$ , extending to vein  $Cu_1$ , with white scales on both sides; terminal area with patch of intraventral white scales in cells  $R_5$  to  $Cu_1$  extending basally, and meeting subterminal line in cells  $M_2$  and  $M_3$ ; black patch at tornos similar to upper side. Secondaries with maculation as in nominate subspecies, but with brown lines in basal part of wing narrower, more irregular in course, with more white; anterior brown area containing bluish spots subrectangular in outline, with lower bluish spot only slightly smaller than median spot, with anterior spot broadly shaded with white scales; posterior brown area with bluish spots subovate, both these patches with black line surrounding bluish spots very narrow, and with adjacent area gray-brown; subterminal brown line narrow, extended inwardly on veins  $M_2$  and  $M_3$  to form a prominent patch, concave medially, reduced to less than half of this width in cell  $M_3$ , where the patch is convex, and of even width across cell; terminal area with considerable white scaling.

EXPANSE: 37 mm.

FEMALE: In shape, wing similar to that of male, but with outer margin of secondaries more deeply sinuate.

UPPER SURFACE OF WINGS: As in male, but with black markings of primaries heavier, and with more violet iridescence.

LOWER SURFACE OF WINGS: As in male.

EXPANSE: 35–36 mm.

TYPES: Holotype, male, near Port Nelson, Rum Cay, Bahama Islands, March 16, 1953 (E. Hayden); allotype, female, New Portsmouth (Rock Sound), Eleuthera Island, Bahama Islands, March 28, 1953 (E. Hayden). Paratype male, Clarence Town, Long Island, Bahama Islands, March 13, 1953 (E. Hayden and L. Giovannoli); paratype male, Deadman's Cay, Long Island, Bahama Islands, March 11, 1953 (E. Hayden); and paratype female, same data as allotype. All types in the collection of the American Museum of Natural History.

This subspecies is distinguished from the adjacent Cuban population (figs. 1, 2) by the more dentate outer margin of the secondaries, the reduced black maculation above, and by the greater area of white on the lower surface of both wings, as outlined above.

*Anaea echemus* (Doubleday)

*Cymatogramma echemus* DOUBLEDAY, 1850, The genera of diurnal Lepidoptera, vol. 2, p. 316, pl. 49, fig. 4.

A male and a female caught at Governors Harbour, Eleuthera Island, March 31, 1953, and James Cistern, Eleuthera Island, April 1, 1953, are referable here.

These two specimens have the basal portions of both wings above reddish brown, which contrasts with the blackish outer portion. The under surface is contrastingly marked also. More material is needed before the status of this population can be satisfactorily settled.

## LYCAENIDAE

*Strymon acis armouri* Clench

*Strymon acis armouri* CLENCH, "1942" [1943], Psyche, vol. 49, p. 53.

Six specimens of this endemic subspecies, from the following localities: Bitter Guana Cay, Exuma Cays, January 13, 1953; Clarence Town, Long Island, March 13, 1953; The Bight, Cat Island, March 22, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953.

These six specimens agree with the diagnosis for this subspecies. However, there is a single female from South Caicos Island, Turks and Caicos Islands, February 11, 1953, that does not fit this category. In fact, it seems to be distinct from any of the described populations for this species. The under surface approaches the maculation of *acis mars* Fabricius (Virgin Islands and Puerto Rico), but differences are present. The most obvious of these differences is that the upper surface of the hind wings has a series of prominent submarginal whitish spots, which are not present on any of the specimens in the Museum collection. More material is needed before it can be decided whether this specimen is an individual variant or represents a distinct population in the south end of the Bahamas.

*Strymon martialis* (Herrich-Schäffer)

*Thecla martialis* HERRICH-SCHÄFFER, 1864, Corresp.-Blatt Zool.-Min. Ver. Regensburg, vol. 18, p. 164.

Twelve examples, from the following localities: Landrail Point, Crooked Island, March 5, 1953; near Albert Town, Fortune Island (Long Cay), March 7, 1953; Fish Cay, south of Fortune Island (Long Cay), March 8, 1953; North Cay, south of Fortune Island (Long Cay), March 8, 1953; near Cockburn Town, San Salvador Island, March 18,

1953; Little Harbor Cay, Berry Islands, May 1, 1953; Allans Cay, Abaco Cays, May 9, 1953.

*Strymon columella cybira* (Hewitson)

*Thecla cybira* HEWITSON, 1874, Illustrations of diurnal Lepidoptera, p. 161, pl. 63, figs. 435, 436.

Forty-three specimens were taken of this species, the most common of the hair streaks. The localities are as follows: Staniard Cay, Exuma Cays, January 13, 1953; Landrail Point, Crooked Island, March 5, 1953; Fortune Island (Long Cay), March 7, 1953; North Cay, south of Fortune Island (Long Cay), March 8, 1953; Fish Cay, south of Fortune Island (Long Cay), March 8, 1953; Deadman's Cay, Long Island, March 11, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; The Bight, Cat Island, March 22, 1953; Bennetts Harbour, Cat Island, March 24, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Mangrove Cay, Andros Island, April 26, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953; West End, Grand Bahama Island, May 12, 1953.

*Strymon angelia dowi* Clench

*Strymon angelia dowi* CLENCH, 1941, Torreia, no. 7, p. 4.

A single badly worn female from McQueen, Cat Island, January 23, 1953, is tentatively placed under this name.

*Leptotes cassius theonus* (Lucas)

*Lycaena theonus* LUCAS, 1857, in Sagra, Historie physique, politique et naturelle de l'ile de Cuba, p. 611.

Forty-seven males and 32 females were taken at the following localities: Alicetown, North Bimini Island, December 30, 1952; Bitter Guana Cay, Exuma Cays, January 13, 1953; Staniard Cay, Exuma Cays, January 13, 1953; Little Farmer's Cay, Exuma Cays, January 17, 1953; Darby Island, Exuma Cays, January 18, 1953; McQueen, Cat Island, January 23, 1953; West Caicos Island, Turks and Caicos Islands, February 4, 1953; South Caicos Island, Turks and Caicos Islands, February 11, 1953; Fish Cay, south of Fortune Island (Long Cay), March 8, 1953; Deadman's Cay, Long Island, March 11, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; The Bight, Cat Island, March 22, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; Nassau, New Providence Island, April 16, 1953; Lisbon Creek, near South Bight, Andros Island, April 28, 1953; Fraziers Hog Cay, Berry

Islands, April 30, 1953; Little Harbor Cay, Berry Islands, May 1, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953; Allans Cay, Abaco Cays, May 9, 1953; West End, Grand Bahama Island, May 12, 1953.

*Hemiargus thomasi thomasi* Clench

*Hemiargus catilina thomasi* CLENCH, 1941, Mem. Soc. Cubana Hist. Nat., vol. 15, p. 407.

*Hemiargus bahamensis* CLENCH, "1942" [1943], Psyche, vol. 49, p. 57.

Twelve males and eight females of this species were taken, as follows: Matthew Town, Great Inagua Island, January 13, 1953; Grand Turk Island, Turks and Caicos Islands, February 19, 1953; Landrail Point, Crooked Island, March 5, 1953; Deadman's Cay, Long Island, March 11, 1953; Clarence Town, Long Island, March 13, 1953; near Port Nelson, Rum Cay, March 16, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; 4 miles southwest of Nassau, New Providence Island, April 8, 1953; Lisbon Creek, near South Bight, Andros Island, April 28, 1953; Little Harbor Cay, Berry Islands, May 1, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953.

Nabokov (1945, Psyche, vol. 52, p. 18), placed *bahamensis* as a synonym of *thomasi*, the latter being considered a good species; this reference was overlooked in the author's previous paper. Three males and one female were taken on Crooked Island, the type locality of *bahamensis*. The under surface of the wings of these specimens is similar to that of the other Bahama examples, although it tends to be slightly darker in color on two of the males. The one feature that is constantly different is the reduced color of the basal spots on the secondaries, which are dark gray on each specimen, instead of the usual black color, which is found on all the other Bahama examples from the expedition.

*Hemiargus ceraunus ceraunus* (Fabricius)

*Hesperia ceraunus* FABRICIUS, 1793, Entomologia systematica, vol. 3, p. 303.

Nabokov (1945, Psyche, vol. 52, p. 23) records this species from "Clarence Town, Long Island, February 1934, leg. Armour Expedition." This is a species that was not included in the author's earlier paper. One badly worn female from Deadman's Cay, Long Island, March 11, 1953, can be placed here, as the genitalia of this specimen agree with the figure given by Nabokov (1945, Psyche, vol. 52, pl. 7, fig. CER 2).

*Brephidium exilis isophthalma* (Herrich-Schäffer)

*Lycaena isophthalma* HERRICH-SCHÄFFER, 1862, Corresp.-Blatt Zool.-Min. Ver. Regensburg, vol. 16, p. 141.

Nineteen specimens were taken, from the following localities: Staniard Cay, Exuma Cays, January 13, 1953; Bitter Guana Cay, Exuma Cays, January 13, 1953; South Caicos Island, Turks and Caicos Islands, February 11, 1953; Landrail Point, Crooked Island, March 5, 1953; Clarence Town, Long Island, March 13, 1953.

This series of specimens tends to have more blue on the upper surface of the wings than does our series of *isophtalma* from Hispaniola. Unfortunately, we do not have any topotypical specimens of this subspecies from Cuba for comparison. It is possible that this series is *barbouri* Clench, but the exact status of this Bahama insect is not known.

#### HESPERIIDAE

*Phocides batabano batabanoides* (Holland)

*Erycides batabanoides* HOLLAND, 1902, Ann. Carnegie Mus., vol. 1, p. 488.

Two females were taken, one at Alicetown, North Bimini Island, December 30, 1952, the other at Clarence Town, Long Island, March 13, 1953.

*Polygonus leo savigny* (Latreille)

*Hesperia savigny* LATREILLE, 1822, Encyclopédie méthodique, vol. 9, p. 741.

Two examples were captured January 23, 1953, at McQueen, Cat Island. In addition, another specimen has been received from New Providence, December 28, 1951 (Dodge).

*Epargyreus zestos* (Geyer)

*Proteides zestos* GEYER, 1832, Zuträge zur Sammlung exotischer Schmettlinge, vol. 4, p. 9, pl. 106, figs. 615, 616.

Nine males and one female were taken at the following localities: New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; James Cistern, Eleuthera Island, April 1, 1953; Little Harbor Cay, Berry Islands, May 1, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953; New Plymouth, Green Turtle Cay, Abaco Cays, May 7, 1953.

*Urbanus proteus dominga* (Scudder)

*Thymele dominga* SCUDDER, 1872, Rept. Peabody Acad. Sci., for 1871, p. 69.

Two males and 10 females were taken at the following localities: McQueen, Cat Island, January 23, 1953; West Caicos Island, Turks and Caicos Islands, February 4, 1953; The Bight, Cat Island, March 22, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953; West End, Grand Bahama

Island, May 12, 1953; Eight Mile Rock, Grand Bahama Island, May 14, 1953.

Additional Bahama material in the Museum collection has been caught at the following places: Los Cayos, Nassau, January 17, February 15, March 23, December 29; Nassau, January 21, 1929 (O. Fraser), April 15, 1945; outskirts of Nassau, March 13, 1930 (W. P. Rogers); New Providence, December 11, 1951 (Dodge).

*Burca braco castigata*, new subspecies

**MALE:** Head, front black-brown, with scattered reddish and white scales; palpi dark above, whitish below, with scattered reddish scales. Thorax and abdomen black, with scattered light gray and reddish scales, especially below.

**UPPER SURFACE OF WINGS:** Ground color black, with brown-black scaling, the outer portion of the wings being slightly lighter in color, and with a few scattered white and pink scales; maculation absent, although the three subapical spots of the primaries may be very faintly indicated.

**UNDER SURFACE OF WINGS:** Ground color as above, but slightly more brownish in tone, with scattered reddish scales, these most prominent in apical area of forewing and being generally distributed over hind wings.

**EXPANSE:** 28.5 to 31.0 mm.; holotype, 30.0 mm.

**FEMALE:** Unknown.

**TYPES:** Holotype, male, New Portsmouth (Rock Sound), Eleuthera Island, Bahama Islands, March 28, 1953 (E. Hayden and L. Giovanoli); paratypes, two males, same data as holotype; paratype male, Nassau, Bahama Islands, January 19, 1929 (D. Fraser). All types in the collection of the American Museum of Natural History.

This subspecies can be distinguished from the nominate Cuban population by its smaller size, darker color, and by the presence of more reddish scaling on the wings and body. A series of five males from Cuba range in wing expanse from 30.0 to 32.0 mm., with an average expanse of 31.4 mm., while this Bahama series ranges from 28.5 to 31.0 mm., averaging 29.8 mm.

The male genitalia of the two subspecies are practically identical.

*Burca concolor atrata*, new subspecies

**MALE:** Head and palpi black, with scattered light gray and reddish scales, the latter more numerous on the palpi.

**UPPER SURFACE OF WINGS:** Ground color black, with dark brown scaling, the outer portion of the wings becoming slightly lighter in color,

and with a few scattered whitish scales; maculation absent; subapical spots of forewings three in number, usually indicated but sometimes partially reduced or absent; postmedian spot in cell  $M_3$  sometimes faintly suggested; fringe with basal half concolorous with wing, outer half tending to be lightly suffused with an iridescent pinkish.

**UNDER SURFACE OF WINGS:** Ground color as above, with outer portion concolorous with basal part; apex of forewings and hind wings, especially in outer portion and near anal angle, suffused with a variable number of grayish white and reddish scales.

**EXPANSE:** 23 to 27 mm.; holotype, 25 mm.

**FEMALE:** Similar to male, but more contrastingly colored and with spots more strongly represented, with postmedian spot in cell  $M_3$  strongly represented, and with spot weakly indicated in cell  $Cu_1$ . Under surface as in male, but with spots as on upper surface; outer portion of forewings tending to have submarginal and marginal areas broadly suffused with red scaling; hind wings with considerable reddish scaling, especially in distal portion of wings.

**EXPANSE:** 25 to 27 mm.; allotype, 25 mm.

**TYPES:** Holotype, male, The Bight, Cat Island, Bahama Islands, March 22, 1953 (E. Hayden, L. Giovannoli, and G. Rabb); allotype, female, Clarence Town, Long Island, Bahama Islands, March 13, 1953 (E. Hayden). Paratypes, all from the Bahama Islands: three males and one female, same data as holotype; seven males, same data as allotype; one female, Deadman's Cay, Long Island, March 11, 1953 (E. Hayden); one male, Bitter Guana Cay, Exuma Cays, January 13, 1953 (L. Giovannoli); one male, near Port Nelson, Rum Cay, March 16, 1953 (E. Hayden); two males, New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953 (E. Hayden); one male, West End, Grand Bahama Island, May 12, 1953 (E. Hayden and G. Rabb). All types are in the collection of the American Museum of Natural History.

This subspecies can be separated from the nominate population from Cuba by its darker and more intense wing color, and by the presence of red or pink scales on the body and wings, which are particularly noticeable on the under surface of the wings. This latter character can be best seen under a microscope. The coloration on the fringes is a quality that appears to depend on the amount of illumination. Under normal light, the fringes are dull colored and concolorous with the wings in both populations; under intense light, the fringes of the Bahama population show an iridescent pinkish color, which is apparently not present in the Cuban specimens.

The amount of pink or red scaling appears to vary somewhat for the

specimens from different islands, those from Cat Island being strongly marked in this respect. Examples from the other localities tend to have slightly less red scaling below in the males. One female was taken on Cat Island, but it was in poor condition; the other two females are rather heavily marked with red scales, more so than in the males.

The male genitalia of the new subspecies show a few minor differences from those of the Cuban subspecies as far as can be determined from a single preparation from both populations. In *atrata*, the two patches of small teeth on the outer portion of the valves are smaller and fewer in number than in the nominate subspecies. There are also some small differences in the shape of the clasper, such as the fact that the posterior portion forms a much sharper angle than in the Cuban example, but whether or not this is individual variation cannot be stated at this time.

*Ephyriades brunnea brunnea* (Herrich-Schäffer)

*Nisoniades brunnea* HERRICH-SCHÄFFER, 1864, Corresp.-Blatt Zool.-Min. Ver. Regensburg, vol. 18, p. 172.

Eleven specimens were taken on this trip. The localities are as follows: cays 3.5 miles southwest of North Caicos Island, Turks and Caicos Islands, February 28, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; Fresh Creek, Andros Island, April 23, 1953; Mangrove Cay, Andros Island, April 26, 1953; Lisbon Creek, near South Bight, Andros Island, April 28, 1953; Hope Town, Elbow Cay, Abaco Cays, May 4, 1953.

*Hylephila phyleus* (Drury)

*Plebeius urbicolae phyleus* DRURY, 1773, Illustrations of natural history, vol. 1, index, p. 25, pl. 13, figs. 4, 5.

Nineteen specimens (16 males and three females) of this widespread species were taken at five localities: South Caicos Island, Turks and Caicos Islands, February 11, 1953; Clarence Town, Long Island, March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953; West End, Grand Bahama Island, May 12, 1953.

*Wallengrenia otho misera* (Lucas)

*Hesperia misera* LUCAS, 1857, in Sagra, Histoire physique, politique et naturelle de l'ile de Cuba, p. 649.

Nine males and one female were captured at the following collecting stations: Warderick Wells Cay, Exuma Cays, January 10, 1953; McQueen, Cat Island, January 23, 1953; Clarence Town, Long Island,

March 13, 1953; near Cockburn Town, San Salvador Island, March 18, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Governors Harbour, Eleuthera Island, March 31, 1953; Nassau, New Providence Island, April 5, 1953 (at light); Fraziers Hog Cay, Berry Islands, April 30, 1953; Marsh Harbour, Great Abaco Island, May 6, 1953.

*Choranthus* sp.

One somewhat worn, dark-colored female was taken on Bitter Guana Cay, Exuma Cays, January 13, 1953. It would appear to belong in *Choranthus*, but its exact status remains uncertain until more material comes to hand.

*Atrytone cornelia* (Latreille)

*Hesperia cornelia* LATREILLE, 1822, Encyclopédie méthodique, vol. 9, p. 764.

One male and one female were taken on Eleuthera Island, the latter March 28, 1953, at New Portsmouth (Rock Sound), the former at Governors Harbour, March 31, 1953, and another male was captured May 12, 1953, at West End, Grand Bahama Island. Another single male is present in the collection of the American Museum of Natural History from the Bahamas; it is labeled Nassau, June, 1897 (C. J. Maynard). This species was described from Cuba.

*Calpodes ethlius* (Cramer)

*Papilio ethlius* CRAMER, 1784, Papillons exotique des trois parties du monde, vol. 4, p. 212, pl. 392, figs. A, B.

Three specimens of this widespread species from the Bahamas are in the Museum collection: Los Cayos, Nassau, September 23, December 29; New Providence, December 8, 1951 (Dodge). This species was not included in the author's previous Bahama paper, and no examples were captured on the expedition.

*Panoquina panoquinoidea* (Skinner)

*Pamphila panoquinoidea* SKINNER, 1891, Ent. News, vol. 2, p. 175.

Two males and four females were taken, as follows: Warderick Wells Cay, Exuma Cays, January 10, 1953; Clarence Town, Long Island, March 13, 1953; New Portsmouth (Rock Sound), Eleuthera Island, March 28, 1953; Hatchet Bay, near Alicetown, Eleuthera Island, April 2, 1953; Grand Bahama Island, May 11, 1953 (at light).

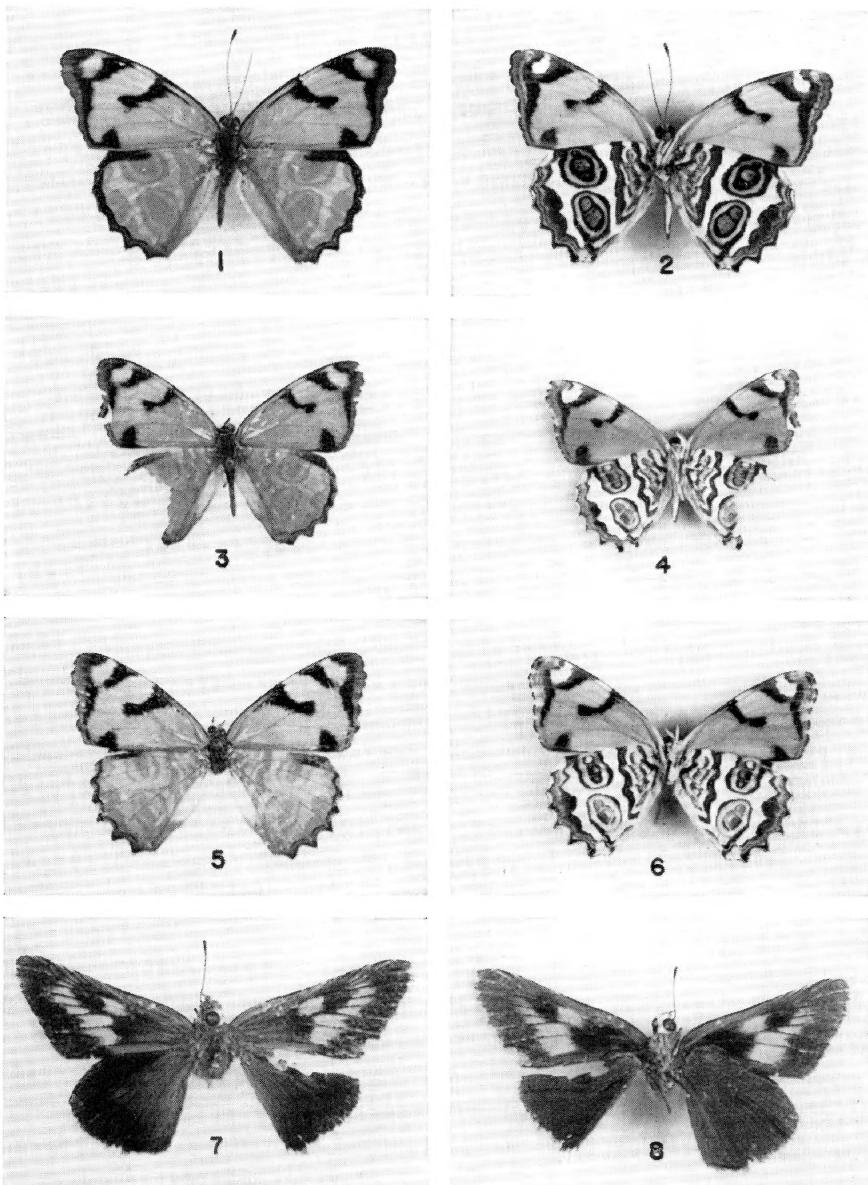
*Pyrrhocalles antiqua eleutherae* (Bates)

## Figures 7-8

*Phemiades antiqua eleutherae* BATES, 1934, Occas. Papers Boston Soc. Nat Hist., vol. 8, p. 137.

A single female was taken March 31, 1953, at Governors Harbour, Eleuthera Island. This is apparently only the second recorded specimen of this very distinct subspecies, and the first female. Bates described it from a unique male from Bannerman Town, South Eleuthera Island.

The Bahama subspecies is apparently quite distinct in maculation from the other named populations, so a genitalic preparation was made to check its specific relationships. Slides were also made from females from Cuba, Jamaica, and the Dominican Republic. The Jamaican population (*P. jamaicensis* Schaus) is a valid species, while the populations from the other islands belong to a second species. The former is distinguished, in the female genitalia, by the fact that the prongs of the ostial plate are naked and very long and slender, while in *antiqua* they are hirsute, short, and thick. It might be noted that the Cuban specimen dissected was from eastern Cuba (*orientis* Skinner), and that this does not agree with the original description by Herrich-Schäffer of nominate *antiqua*.



FIGS. 1-2. *Lucinia sida sida* Hübner, Cuba. 1. Upper surface. 2. Under surface.

FIGS. 3-6. *Lucinia sida albomaculata* Rindge. 3. Holotype, upper surface. 4. Holotype, under surface. 5. Allotype, upper surface. 6. Allotype, under surface.

FIGS. 7-8. *Pyrrhococles antiqua eleutherae* (Bates), female. 7. Upper surface. 8. Under surface.